Lesson 20 - The Physiology Of Digestion

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1. Introduction

It has often been said: "You are what you eat." More appropriately, this should probably be: "You are what you digest and assimilate."

Man eats everything. He considers himself an omnivore of the first order. Roots, nuts, tubers, seeds, eggs, blood, milk, fish, fowl, and fruit have all appeared on man's plate. One culture eats worms and gnats with relish. Another culture considers decaying animals a delicacy. Man has practiced cannibalism both in the past and in the present.

And so man brags: "I can eat anything. I have an iron stomach."

It is true that man's physiology allows him to eat almost anything that does not immediately kill him. Sometimes even great quantities may be consumed, as witnessed by the champion crayfish eater of Louisiana who ate 63 pounds of crayfish tails at one sitting. It is a mistake to assume, however, that the body can digest and assimilate everything that passes between our teeth, or that foods doing no immediate harm will not eventually cause problems.

Consequently, most of what man eats is for naught, because much of the food eaten by the average human being is totally unsuitable for his digestive physiology. If we want to understand what foods are appropriate for man to eat, we must first understand the physiology of digestion and assimilation. We need to know how our body acts upon the food we eat. When we understand the principles of nutritional physiology, we can then determine the natural diet for man.

1.1 What is Nutrition?

Dr. Herbert M. Shelton gives us this definition of nutrition: "It is the sum of all processes by which raw materials (foodstuffs) are transformed into living structure and prepared for use by the body."

No one understands these processes completely. The transformation of an apple, for example, into the cells that make up the brain, blood and bone is an event that defies scientific duplication. The changing of food into the person that is you could be considered a miracle—yet it is a miracle that happens repeatedly throughout every day.

We can follow food through the body as it undergoes processing by the digestive organs. We can give names to the various enzyme interactions and to the catalysts that accompany food absorption. We cannot, however, tell you how the life force present in a fruit becomes part of the life force that propels your body or awakens your consciousness. These are the limitations of the science of nutritional physiology, and we must keep our discussion within the scope of these boundaries.

From a purely physiological point of view, nutrition can be described by the mechanical and chemical actions of the body upon the food ingested. Notice that the body is active and food is passive; the body acts upon food—food does not act upon the body.

As Dr. Herbert M. Shelton states: "Food is inert substance and, therefore, has no power to make living organisms. It cannot act, but is acted upon. The living organism uses what it can of the food consumed and rejects the rest. A particular food may be good, but to feed more of it than can be utilized...is worse than useless."

The idea that foods have in themselves no power to act upon the body distinguishes Life Science and Natural Hygiene from other traditional schools of nutrition. Many nutritionists still believe in "food therapy"—that is, that certain foods can perform specific actions upon the body to effect a cure or treatment. Life Science decrees that there are no "cures," whether they be in the form of medicines, herbs, foods or juices; instead, the body is a self-healing mechanism. Hopefully, by studying the physiology of nutrition, you will be able to see the fallacy of regarding foods as active healing agents.

Nutrition is the physiological processes the body conducts as it transforms food into material for its own growth and maintenance. This lesson discusses these processes in the order that they occur in the body as food is appropriated, digested, assimilated and finally eliminated from the body.

2. The Journey Of Food

Food enters the body through the mouth and exits through the anus. In between, it undergoes digestion (from the mouth to the stomach), absorption (from the stomach to the small intestines), and elimination (from the large intestine, or colon, to the anus). In most cases, these three stages of food processing take place in a total of about twenty-four hours in a relatively healthy individual. This journey takes place in what is on the average over fifteen feet of a single connected tube from the mouth to the anus.

This fifteen feet of elasticized tubing (which includes the esophagus, stomach and intestines) is said to be continuous with the outside environment. That is, there is one entrance from the outside world to the food tube (the mouth) and one exit (the anus) with no other outlet inside the body proper.

Food in this tube (usually called the gastrointestinal tract) is technically considered to be outside the body. As food passes through this tube, it may be partially absorbed by the body. At any time, the food itself may be rushed back out through the mouth (vomiting) or quickly expelled through the anus (diarrhea).

This is the reason that man can seemingly eat anything. His digestive-absorptive-eliminative tract, or tube, actually holds the ingested food outside of the body proper. If a healthy person should eat harmful foods, they may be carried through the body to the nearest exit without actually being absorbed or entering into the body from this tube.

However, many individuals, through years of improper eating, have degraded the natural power of the body to expel unsuitable foods. Consequently, the body gradually starts to absorb noxious substances from foods which a healthy organism would reject outright.

Consider this example: If a young infant is given a swallow of strong coffee, he or she will probably vomit it back up or experience immediate diarrhea. This is because the gastrointestinal tract of a young child is still sensitive and strong enough to actively inhibit such substances from entering the body.

People who have been vegetarians for several months will often experience this reaction if they, should

attempt to eat meat again. A healthy body will try to protect itself from harmful non-food items.

The gastrointestinal tube is the pathway all food must follow in its process of digestion and assimilation. What occurs along this path is discussed in the next sections of this lesson.

2.1 The Appropriation of Food

Appropriation is the making of something into one's own. Appropriating foods, then, is the act of taking food into the body. The first step toward digestion and assimilation of food is the physical selection of food. This selection is guided primarily by visual and olfactory cues.

Our first contact with food is visual. Young children originally try to discover what is good to eat and what is not by sticking everything within their field of vision into their mouths. If it tastes good, it is food and is swallowed. If not, it is spit out. While effective, this is not the best way to choose food. A variety of items such as rocks, dirt, loose coins, and so forth are often swallowed by children in their exploring quest for suitable food.

Gradually, the child learns to recognize food items by sight. An orange is orange and is for eating, and a baseball is white and is for knocking over breakable items. Very quickly, children learn to recognize food by visual cues alone, and adults soon take this aspect of food appropriation for granted.

Visual appearance of food is an important part of the digestive process. People start to salivate at colorful pictures of food dishes. If the food is pretty and served in a visually pleasing manner the amount of digestive juices secreted is greater than if the food appears distasteful or if it is served in unpleasant surroundings.

The visual appeal of an apple hanging on a tree in an orchard is evident; that same apple stuck in the mouth of a roasted pig, however, does not raise the same expectations in the eater.

Food that is simply unfamiliar is often automatically rejected. Some people refuse to eat yellow tomatoes because they "look funny." Thereby they may miss a wonderful taste sensation.

All of this may seem obvious, but it is often overlooked in the physiology of nutrition. The body begins to respond immediately when food is placed within the visual field. If the food itself or the surroundings within which it is presented are unappealing, then actual digestion and assimilation of the blood will be impaired. If, on the other Hand, food is artfully presented in a visually pleasing manner, digestion is enhanced.

This does not mean that a lot of artifice should be used in preparing food. On the contrary, if food is naturally attractive, such as fruits or vegetables, then a minimum of 'stage dressing' is required. Notice that advertisements for steaks and hamburgers prominently feature salad with vegetables, their attractive colors of red, green and yellow to contrast with the distastefully brown or black meat. Digestion, or lack of it, begins with the eyes.

2.2 Olfactory Cues

The nose is the next organ involved in the physiology of digestion. The fragrance of food stimulates the olfactory nerves, which in turn starts the salivation process. This does not mean, however, that food must be overwhelmingly 'fragrant,' as is the usual case with cooked foods and spices and onions.

Smelling food is actually a subtle experience that may require re-educating the sense of smell if it is jaded by over-seasoned cooked food. An apple gives a subtle bouquet of odors to whet the appetite. The smell of ripening bananas or a bowl of strawberries is more enjoyably overwhelming to the healthy individual than is the stench of onions and garlic piled upon burnt meat.

The eyes and the nose, then, are the first organs used in the process of digesting and assimilating food. It is important, therefore, that time be taken to appreciate and select food according to its appearance and smell.

2.3 Alimentation: From the Mouth to the Stomach

After food is chosen according to sight and smell, it is brought towards the mouth and saliva starts to secrete. The mouth is the first step in the digestion of food proper.

The digestion of food can be viewed as two concurrent processes: 1) *Mechanical*, or the actual movement of food as it is broken down into smaller particles; and 2) *Chemical*, or the splitting of food into its simple nutritive components. In the mouth, mechanical digestion is performed by the actions of the teeth and tongue, while the saliva furnishes the first step of chemical digestion.

2.4 The Mouth

The teeth perform the first mechanical operation of digestion. Food is first bitten by the *incisor* teeth at the front of the mouth. Then the *canine* teeth (next to the front teeth) shred the food into smaller parts as it is passed back to the *bicuspids*, which continue tearing it into smaller portions. Finally, the *molar* teeth (in the back of the mouth) finish the grinding and crushing of the food.

Chewing by the teeth increases the surface area of the food so that it may be more easily penetrated by the digestive enzymes. Chewing the food is a very important part of digestion. Not only does it break {he food down into more easily digestible...particles, but it also stimulates nervous impulses that cause the secretion of gastric juices, and thus prepare the digestive system for the food to be swallowed.

The teeth are very powerful. The front teeth, which tear and shred food, can exert a force of up to 80 pounds. while the grinding molars can apply 100 to 250 pounds of force against food particles!

At the same time that the teeth are doing their work, the tongue is performing the other aspect of mechanical digestion in the mouth by moving the food back and forth, from side to side and mixing it with the saliva.

The salivary glands help perform chemical digestion in the mouth. There are three pairs of salivary glands in the mouth. They continuously secrete saliva to keep the mouth from drying out. During the day, these glands produce from 1 to 1 1/2 quarts of saliva.

The saliva prepares the food for swallowing by lubricating it with *mucin*, which gives saliva its slippery characteristic. Imagine how hard it would be to swallow food "dry" without this natural lubrication.

The first digestive enzyme is also contained in the saliva. It is called *ptyalin* or *amylase*. This enzyme starts the digestion of starches in foods, Ptyalin helps convert starch to a sugar called *maltose*.

Since this enzyme is the major factor in starch digestion, all starchy foods should be chewed thoroughly and mixed well with saliva. Human beings, however, are not well adapted to eating starches, so the amount of starches in the diet should be restricted.

Saliva also has a solvent action upon food. It is only after the food is somewhat dissolved that it can be tasted.

In addition to ptyalin, saliva has an enzyme called lysozyme that digests bacterial cell walls, thus killing certain microorganisms. Saliva also has a cleansing action as its constant flow helps to dissolve and remove food particles from the teeth.

After mechanical and chemical digestion has progressed to a certain point in the mouth, the tongue gathers the food together into a small ball and then elevates the mass of food back into the pharynx of the throat. This is the first stage of swallowing and the beginning of the food's journey down to the stomach.

2.5 From Mouth to Stomach

After food rolls off the tongue, it is no longer under voluntary control. It is now moved through the

system under the control of the involuntary nervous system. Short of self-induced vomiting, it is now up to the wisdom of the body to move the food as it sees fit.

After leaving the tongue, it will take about 8 seconds for the swallowed food to reach the stomach. Most of this time is spent traveling down a tube called the *esophagus*.

The food passes down this tube in a peristaltic (wave-like) motion. These *peristaltic* waves are strong enough so that even if suspended upside down, a person can swallow about a half-ounce of food and it will work its way against gravity into the stomach. This is why astronauts can eat in "free fall" or zero-gravity. This is also why they must eat in small sips or swallows, being careful not to take in over a half ounce of food per swallow.

Pure liquids can move down the esophagus in only one second, eight times faster than the peristaltic waves move the solid food.

2.6 The Stomach

The food passes from the esophagus into the stomach through an opening called the cardiac orifice. As soon as food enters the stomach, a hormone called *gastrin* is released into the bloodstream.

This hormone is carried to the gastric glands in the stomach which causes them to secrete digestive juices. These gastric juices help in the chemical digestion of the food, while the rhythmic contractions of the stomach contribute to the mechanical process of digestion.

The gastric juices in the stomach are secreted at the rate of two to three quarts per day. These juices contain primarily hydrochloric acid (HCl) and digestive enzymes.

The hydrochloric acid makes the stomach a very acid environment with a pH factor between 1.5 and 3.0 (as compared to pure lemon juice, with a pH factor of 2). This acid environment caused by the HCl secretions serves two, functions: 1) it acts as a denaturant in digestion of proteins; and 2) it kills small parasites that are often found in all foods.

Three primary enzymes are also present in the gastric juices. The first is *pepsin*, which aids in the hydrolysis of proteins. The pepsin enzyme begins breaking down complex proteins into their simpler forms. It does not actually split the proteins into amino acids (the end-product of protein digestion), but it prepares them for that process which occurs in the intestines. The pepsin enzyme works best in a fairly acid environment. An acid environment is also conducive to protein digestion.

The second enzyme is called *lipase*. This aids in the hydrolysis of fats. Lipase starts the digestion of fats by aiding their breakdown into glycerol and fatty acids. The lipase enzyme works best in a more neutral pH environment than does the pepsin enzyme.

The third enzyme, found only in the gastric juices of infants, is called *rennin*. Its primary function is the hydrolysis of milk proteins. Adults do not have the rennin enzyme in sufficient quantity to digest milk products. Consequently, the only time milk should be used in the diet is during infancy and young childhood. Even at these times, the only suitable milk is that from the lactating mother. Milk from cows, goats, etc. is not of the same composition as is mother's milk and should not be consumed by humans of any age.

These three enzymes, along with the gastric juices, are mixed into the food by the mechanical actions of the stomach. The stomach contracts in waves at the rate of three per minute. The stomach has a capacity for holding up to two quarts of food in volume. When a person is fasting, the actual volume of his or her stomach may be less than two ounces.

The gastric juices mixed in by the contracting and relaxing stomach are initially stimulated by the thought, sight, smell and taste of the food. This occurs before any food has actually entered the stomach. These juices are sometimes called the "appetite juices", and they may be suppressed if the food appears unappetizing, smells bad, or is eaten in an unpleasant environment.

Digestive secretions in the stomach are increased by attractive and well-liked foods as well as by a state of contentment and happiness. The secretions are decreased by large meals, large amounts of fat, poor chewing, poor appearance of food and negative emotions.

In the presence of intense pain, fear, or depression, gastric juices may be almost completely suppressed for up to twenty-four hours. This fact alone is reason enough not to eat when upset or feeling out of sorts.

The stomach empties at the slow rate of about 3/100 ounce for each peristaltic wave. At three waves per minute, it can take up to five hours for two pounds of food to leave the stomach.

The emptying time of the stomach also varies with the type of food present. Water and liquids leave the stomach most rapidly. Carbohydrates empty more quickly than proteins; proteins, in turn, leave the stomach more quickly than fats.

Within five minutes after fat enters the stomach, a hormone called *enterogastrone* enters the bloodstream and travels to the stomach, "this hormone inhibits the motion of the stomach and causes it to empty at a much slower rate.

Not all foods undergo the same digestive processes in the stomach, and not all foods leave the stomach at the same rate. Proteins digest in an acid environment, while fats need a neutral environment. Carbohydrates leave the stomach at a faster rate than proteins, and so on.

Even among the carbohydrates (fresh fruits and vegetables), digestion time may vary a great deal. Below is a chart listing the time that various foods remain in the stomach:

Food	Minutes Held In Stomach
Parsley	75
Lemon	90
Grapes	105
Tomato	120
Carrot	135
Almond	150
Apple	165
Banana	180
Peanut	195
Eggplant	210
Persimmon	225

Turnip	240

Since different foods require different sets of environments in the stomach to digest properly, it is reasonable to assume that if these foods are put into the stomach at the same time, difficulties could occur. That is exactly what happens.

Consider the all-American cheeseburger. A bite of it might contain a starch (bread) a protein (meat), a fat (cheese), and an acid (tomato), what happens when a single bite of this hits the stomach?

The starchy bread was probably not chewed very thoroughly in the mouth and the starch-digesting enzyme had little chance to do its work. So, the bread reaches the stomach in an unprepared state. The meat will require a very acid environment to digest. This makes it difficult for the starch to digest, since acids are inimical to starch digestion. The fat in the cheese requires a more neutral environment than the meat protein to digest, and its fat content causes the stomach to slow its digestion. At the same time, the acids in the tomatoes interfere with the starch digestion of the bread.

In this single bite, there are over seven different types of food requiring four different sets of enzymes and digestive conditions, and all digest at different rates!

At best, such a conglomeration of food in the stomach will slow digestion down to the point of fermentation. This will lead to autointoxication. At worst, the food simply becomes half-digested and is pushed sluggishly through the system, releasing its poisons and gases throughout the body.

The same people who would never mix water, kerosene, or oil with their gasoline for their car will sit down to a meal and give their stomachs a mixture of mashed potatoes, steak, butter, and beer.

Fortunately, the stomach does not break down as fast as an abused automobile. But the stomach's resilient quality causes people to think they are getting away with their dietary indiscretions.

If different foods are to be put into the stomach at the same meal, they should at least be of the same type that requires the same set of digestive conditions. Ideally, of course, only one food should be eaten at a meal to insure optimum digestion.

Since food combining is such an important area, it is covered in a separate lesson in this course.

2.7 The Small Intestine

The small intestine consists of about 9 feet of inch tubing coiled in the abdomen. This tubing leads from the stomach to the large intestine. It is in the small intestine that most of the digestion and absorption of food occurs.

Food passes into the small intestine from the stomach by entering the *duodenum*. The duodenum is the smallest segment of the intestine, being only 8 inches long. Food travels through the small intestine by weak contracting waves of motion that propel the food toward the large intestine.

The other two segments of the small intestine are the *jejunum*, which is 3 feet long and connects the duodenum to the *ileum*, the final 3 feet of the small intestine.

The small intestine interior has many folds. Along the surfaces of these folds are tiny finger-like projections called *villi*.

The villi of the intestine move back and forth, like thousands of tiny tentacles, passing through the food as it is moved along the intestinal tract. The villi play an important role in the absorption of food from the small intestine.

Through the center of each villi is one or more fine white vessels called *lacteals*. The lacteals are part of the lymphatic system. Their principal function is probably the absorption of fat.

As food passes through the small intestine, it is taken up, or absorbed, by structures in the wall of the

intestines, especially the villi, and is then secreted into the lacteals. Some of the digested food is absorbed by the numerous blood vessels that line the villi. This digested food directly enters the bloodstream.

As digestion progresses in the small intestine, portions of food are moving in large quantities into the capillaries of the intestinal villi. Blood from the intestines containing these products of digestion is collected in the *portal vein*, which is connected to the liver.

The liver removes the excess glucose from the blood (glucose being one of the end-products of digestion) and stores it as glycogen, to be used later in normalizing the blood-sugar level and for supplying energy. It also attempts to detoxify harmful elements in the food (such as pesticides), and regulates the level of nutrients available to the body.

The liver is one of the master organs in the body. It receives all the end-products of digestion. The bulk that remains behind after the vital elements are extracted by the villi in the intestine and sent to the liver is then pushed down toward the large intestine. Normally, most of the contents of the intestines have been absorbed by the time the food reaches the middle of the jejunum segment of the intestine, or about 3 feet along the 9 feet of tubing that makes up the small intestine.

The tone and motility of the small intestine is increased by foods served at room temperature, fibrous foods, and high-carbohydrate, low-fat foods. Movement is slowed by cold, dry, and high-fat foods.

2.8 The Large Intestine or Colon

The small intestine joins the colon in the region of the right groin. At this juncture is the *ileo-cecal* valve whose purpose is to control the speed of passage of substances from the small intestine and to prevent any wastes from returning to it from the large intestine. The ileo-cecal valve opens into the colon into a pouch known as the *cecum*, the first receptacle for waste residue.

At the tip of the cecum is the appendix. Due to the appendix's position near the waste receptacle, toxins from a diet high in meat, heavy starches, etc. can contribute to its inflammation which may result in a condition known as appendicitis.

If a person suffering from appendicitis simply abstains from all food (fasting), then the\body can conduct its housecleaning and clear up the inflammation without removal of the appendix.

From the cecum, the large intestine ascends on the right side to the middle of the abdomen, then crosses to the left side and descends again. These three sections are called the *ascending*, *transverse* and *descending* colons.

One of the chief functions of the colon is the reabsorption of much of the water used in the digestive process. If all the water in which the digestive enzymes were secreted was lost in the feces, man would have to drink liquids continually.

If too much water is expelled with the feces, then a condition known as diarrhea exists. Diarrhea happens because of an irritation in the stomach and small intestine due to unsuitable food or inflammation. In this case, the colon expels all of its waste residue upon entry without holding it for water reabsorption.

On the other hand, if the waste material moves too slowly through the colon, then excessive water is reabsorbed and the feces become hardened. This is called constipation.

Waste material may move too slowly through the colon for a number of reasons. Perhaps the most usual reason is that peristaltic nerves are paralyzed by toxicity from decaying foodstuffs.

Another reason for the slow movement of waste through the colon is that the passageway has become very small due to poor tone or to hardened feces clogging the intestinal walls.

After several years on a conventional low-fiber diet, the average adult continually carries around about

ten to twenty pounds of fecal material on the colon walls. In many instances, the distended abdomens in overweight individuals are not due so much to fat as they are to accumulation of feces over a period of years. Autopsies on much individuals have sometimes revealed over fifty pounds of fecal material in the body!

When the body is abused by the modern diet, the colon often suffers the most. Fortunately, a diet high in natural fiber (that is, raw fruits and vegetables) can greatly aid the body in restoring the health of the intestines.

The last portion of the large intestine is the *rectum*. This segment serves as a storage chamber for the feces until defecation. The feces are eliminated from the rectum through an opening called the anus.

And so the journey of food through the body is completed. Many healthy individuals process the food from the mouth to the anus in about sixteen to twenty-four hours. Most adults eating a conventional diet, however, generally take from forty-eight to seventy-two hours for their food to complete its journey. Much of this added delay is due to incompatible food combinations and lack of colon vitality.

Now that we've followed the bodily journey of food from its beginning to end through the gastro-intestinal tract and learned about some of the physiological processes that accompany this journey, we will proceed to determine an optimum diet, one that promotes digestive efficiency and general well-being.

3. The Physiological Determinants of the Optimum Diet

A wealth of information exists about the physiology of food digestion and absorption. Unfortunately, the science of nutrition has often depended upon "rat experiments" and artificially induced deficiencies, rather than upon the true needs of humans, to determine dietary requirements.

A more reasonable approach to determining the true dietary nature of humans is to study human anatomy and physiology. By studying human physiological nature, certain characteristics of the proper diet can be deduced that are in accordance with the inherent nature and anatomical makeup of humankind. This approach does not depend upon contrived experiments, nor is it already biased by what the majority of people believe a traditional diet should be. Instead, human physical capabilities and predispositions are the chief factors in determining true dietary needs.

3.1 Food Appropriation

The diet of most animals is largely determined by their food-gathering equipment. The long neck of the giraffe enables him to feed upon the foliage of trees. The teeth and claws of the lion are its means of killing and rending animals for its meals. The eagle's eyesight and power of flight make this creature a formidable predator of ground rodents.

So, it is salient to ask, how are you physiologically equipped to obtain your food? You have no sharp claws for tearing, no pointed teeth for slashing, nor are your eyes or sense of smell very well developed for hunting. You cannot run fast enough to chase down your prey nor can you naturally swoop through the sky or dive deep into the ocean.

You do have a marvelous set of fingers with an oposable thumb and limbs for reaching and climbing. Actually your food-gathering capabilities are very similar to the chimpanzee's!

Only man can plant and harvest. He can peel oranges and bananas and pick berries and grapes. He can climb the trees for fruits or gather the vegetables from the ground. Of all the creatures on the earth, man is most ideal for being a gardener and caretaker of the plants and trees.

Man's hands set him apart from the other animals in his food-gathering capabilities. Man appropriates his food by picking fruits from trees or by planting vegetables. It is the hands of man that are used to obtain his food, and the most natural things for such a being to eat are those foods that can be gathered and harvested—the fruits, vegetables and nuts of the earth.

3.2 The Mastication of Food

Man's teeth are not curved or sharpened like those of the wolf or tiger, nor are they wide and flat like those of the grass-and-grain-eating animals. Instead, they are shaped most similar to the fruit-eating monkey's.

The saliva in man's mouth has a different acidity entirely than that of the meat-eating animals; it is much less acidic. Nor is man's saliva as efficacious in digesting starches as is the saliva of grain-and-tuber-eating animals.

Man's mouth is actually best suited for eating succulent vegetables and fruits.

3.3 The Stomach

If a dog swallows a bone and it proceeds to its stomach, it will be completely dissolved by the dog's strong gastric juices. Carnivores may safely gulp hunks of meat whole because of the high acidity of the juices in their stomachs.

Humans have choked to death on similar chunks of meat. It is interesting to note that almost all of the fatal chokings on food have involved pieces of meat (vegetarians, beware: peanut butter is a close second on fatal food chokings).

Unlike the grass-and-grain-eaters (such as cattle), man's stomach cannot process large amounts of cellulose. He cannot regurgitate and re-chew his food as does the cow, for example.

Nor can man's stomach digest a mixture of all different types of food. Each food requires its own special set of digestive conditions in the stomach. Notice too that little or no starch digestion occurs in the stomach, and that fat digestion is a lengthy process that is only successful for small amounts of unheated fats.

Obviously, anything in the world can be put into the stomach, and probably has. However, the physiology of the stomach is such that only foods in compatible combinations can be effectively digested.

3.4 The Intestines

The length of man's intestines is much longer than that. of the carnivore's. This is because meat tends to putrefy rather quickly in the intestines and must be expelled quickly. Man's lengthy intestinal tract cannot handle low-fiber foods such as meat quickly. Consequently, such foods decrease the motility of the intestines and fermentation results, along with eventual constipation.

Cancer of the lower intestines occurs only among populations of meat-eaters. It is virtually unheard of when a diet high in natural fiber (raw fruits and vegetables) is adopted.

Constipation also disappears on a high-fiber diet. Fruit-and-vegetable-eating animals maintain excellent tonality of the intestines and usually experience a natural bowel movement after each feeding.

3.5 The Optimum Diet

Let's review the physiology of digestion so that we may determine the optimum human diet. First, it is obvious that man is built to be a gardener and harvester of fruits, vegetables and nuts. He does not possess the physical apparatus that the carnivorous animals have. Second, the teeth, saliva and digestive enzymes of man point to a diet consisting mainly of fruits and non-starchy, vegetables.

Third, the length of the small intestine is too long to handle putrefying meat and is too short for grasses and grains. Humans should eat a high fiber, high-moisture diet to insure health of the small and large intestines.

From these observations, it is evident that the optimum articles of diet for man are fresh fruits and succulent vegetables. Strictly speaking, based upon man's digestive physiology, the following raw foodstuffs make up the optimum diet, listed in order of preference:

1. Fresh fruits;
2. Succulent fruit-like vegetables;
3. Leafy greens and sprouts;
4. Non-starchy vegetables; and
5. Nuts and seeds.

The following foods, while not optimum, can be handled by man's digestive physiology in small amounts when properly combined:

1. Starchy vegetables;
2. Grains and
3. Legumes.

The next foods, while sometimes eaten on a vegetarian, diet, are not well adopted to man's physiology and place an undue strain on the organism:

1. Free oils; and
2. Dairy products.

These foods are definitely disruptive of man's health and are not compatible with his physiology:

1. Meat;
2. Eggs;
3. Refined starches and sugars;
4. Salt, herbs, spices, etc.;
5. All processed, preserved and artificial foods; and
6. Cooked foods.

The person desiring optimum health should eat exclusively from the first list of foods. These foods are most compatible with human physiology. Within this category, foods should be eaten in moderate amounts and in proper combinations.

The ultimate diet that is most conducive to human physiology and that promotes the highest level of health is the mono-fruit diet; that is, the eating of a single variety of fruit for each meal.

4. Questions & Answers

I have just started the diet of fresh fruits and vegetables recommended in this lesson, but I'm

experiencing diarrhea. What's wrong?

Nothing, actually. It is perfectly natural to have alternating periods of diarrhea and constipation when you are first changing your diet. Your entire intestinal tract is being swept clean by a high-natural fiber diet and its tone is improving to the point where it can do some much-needed "housecleaning." The diarrhea you are experiencing is probably occurring due to the elimination of very old fecal deposits along the colon walls. Some people, however, have periods of diarrhea because their intestines are very sluggish due to years of abuse. They are not ready for a natural diet high in fiber and roughage. If you feel that this is similar to your case, try eating foods such as bananas, avocadoes, melons, etc. that are low in roughage. Eventually, your intestines will be toned-up enough so that you experience a normal bowel movement after each meal.

I don't really understand this business about putting only one food at a time in my stomach. Seems pretty boring!

Of course, meals should be enjoyable and satisfying. While the mono-diet is the ideal diet, it may be difficult for the person used to the average mixed diet of meat, potatoes and gravy to suddenly eat only grapes or bananas for lunch. If this is the case, continue eating your usual foods, but make sure that they are combined for better digestion. In other words, instead of having mashed potatoes and bread (two heavy starches), try a baked potato and salad for ease of digestion. Gradually, as the diet improves, you will be attracted toward simpler eating without feeling like you are making a "sacrifice."

It makes sense that our anatomy is most like that of the fruit-eating animals. But, it seems like man can adapt to anything. Whatever he wants to eat, he can get away with.

If you are satisfied with the low-level of health "enjoyed" by modern man, then it is difficult to make a complete diet change. Consider this, however: very few individuals have experienced the highest state of well-being that accompanies radiant health. People transgress natural dietary laws almost from birth. Consequently, if you think good health is merely the absence, of painful symptoms, you are missing the point entirely. Optimum health produces such marked improvements in physical, mental and emotional health that it becomes a joy to live according to the laws of nature. True, you can eat anything you want—that is man's free choice. However, you can only achieve perfect health by living in accordance with the innate dictates of your own physiology.